

REMARKS

I. INTRODUCTION

Applicants have amended claims 1, 5, 8, 10, and 14. No claims have been canceled. Claims 1-16 are presently pending in this application. Reexamination and reconsideration are hereby respectfully requested.

II. CLAIM REJECTIONS UNDER 35 U.S.C. § 102(b)

Claims 1 and 10 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Velasquez et al. (U.S. 5, 746, 781). Claims 1 and 10 have been amended, and Applicants respectfully overcome this rejection.

Claim 1 as amended recites, “A battery unit, comprising: a plurality of bicells wherein each bicell contains anodic exposed grids at a first end of said bicell and cathodic exposed grids at a second end of each bicell, said second end opposing said first end relative to a horizontal axis; a positive terminal wherein said positive terminal is configured to be in connection with said cathodic exposed grids; a negative terminal wherein said negative terminal is configured to be in connection with said anodic exposed grids; and a packaging envelope configured to enclose said bicells, said packaging envelope comprising a single sheet of laminated, aluminized flexible material.” (emphasis added).

Therefore, amended claim 1 recites a packaging material configured to enclose each bicell. At most, Velasquez et al. disclose a laminating material to package each cathode current collector and anode current collector of each bicell, not a “laminated, aluminized flexible material” configured to enclose the plurality of bicells, as positively claimed. In Velasquez et al., at least one side of the anode current collector of each bicell is laminated with an anode material film comprising: a polymer, an intercalation carbon material, and a plasticizer. Additionally, at least one side of the cathode current collector(s) is laminated with a cathode material film comprising: a polymer, a cathode active material, and a plasticizer. Therefore, each bicell is encapsulated by the material film on the exterior sides of the cathode current collectors or the exterior sides of the cathode current collector and anode current collector. Each bicell of Velasquez et al. is not packaged with “a single sheet of a laminated, aluminized flexible material,” as positively claimed. Therefore, amended claim 1 is not anticipated by Velasquez et al.

Claim 10 as amended recites: “A battery module, comprising: a plurality of battery units configured such that said plurality may be stacked; positive terminals each located at a first end of the battery unit, a first number of positive terminals being equal to the number of said plurality of battery units; negative terminals each located at a second end of the battery unit, said second end opposing said first end relative to a horizontal axis, a second number of negative terminals equal to the number of said plurality of battery units; and a packaging envelope for each one of said battery units, said packaging envelope comprising a single sheet of laminated, aluminized flexible material.” (emphasis added).

Therefore, amended claim 10 recites a packaging material, comprised of a single sheet of “laminated, aluminized flexible material,” configured to enclose a single battery unit, each battery unit comprising a plurality or stack of bicells. In Velasquez et al., a fusion station forms a bicell by fusing polymeric layers to the anode and cathode(s) under heat and pressure, and the bicells are formed into stacks. Exposed tabs of the anode and cathode current collectors that are not laminated by the material film are welded together. These tabs are also welded to conductive anode leads or conductive cathode leads. Each stack of bicells is then placed in the recess of a stack receptacle, so that at least portions of the anode lead and cathode lead extend beyond the outer periphery of the stack receptacle.

At most, Velasquez et al. disclose a laminating material to package each cathode current collector and anode current collector of each bicell, not a laminating material to enclose a stack or plurality of bicells, as positively claimed. Furthermore, at most Velasquez et al. disclose a stack receptacle with a recess into which the stack of bicells is placed and then sealed with a lid. Velasquez et al. does not disclose an envelope-like packaging material comprising a “laminated, aluminized flexible material” as positively claimed by amended claim 10. The packaging of amended claim 10 is folded over the stack of bicells so that it comes in contact with itself in three locations: a first end of the stack of bicells, a second end of the stack of bicells, and an edge along the axis of fold. This packaging material is then sealed to itself, and no receptacle with accompanying top is necessary to complete sealing.

The Office notes that “[t]he bicells [of Velasquez et al.] are packaged in a moisture-impermeable envelope (col. 12, ll. 45-50).” Office Action, p. 3. Amended claim 10 overcomes this rejection because although the aluminum layer of the “laminated, aluminized flexible material” recited by amended claim 10 does provide a bi-directional moisture barrier,

the aluminum layer is but one layer of the packaging material. The envelope-like packaging material recited in amended claim 10 differs from the “moisture-impermeable envelope” disclosed in Velasquez et al. because it encloses the stack of bicells and serves as a moisture barrier without the addition of a stack receptacle and top to complete sealing of the stack. The “laminated, aluminized flexible material” as positively claimed is not disclosed by the “moisture-impermeable envelope” of Velasquez et al. Therefore, amended claim 10 is not anticipated by Velasquez et al.

Moreover, the Office Action states that in Velasquez et al., “Each current collector is also connected to a current collector tab (terminal) which extends from the edge of the current collector.” Office Action, p. 2. The Office indicates that the current collector tab is identical to the terminal in amended claim 1. However, Velasquez et al. elaborate on the current collector tab within the Detailed Description of the Preferred Embodiments of the Invention, and according to Velasquez et al.:

Each current collector tab is integral to the current collector. By integral is meant that the body of the current collector and tab form a unit, that is, they are not separate members that are attached (e.g., welded) together.

Velasquez et al. (U.S. 5,746,781) (col. 12, ll. 8-12). (emphasis added).

Velasquez et al. disclose a current collector that is integral to the tab, not a separate terminal, either positive or negative, that is welded to the exposed grids of the cathode or anode respectively, as positively claimed.

For all these reasons, amended claims 1 and 10 are not anticipated by Velasquez et al. and Applicants respectfully request reconsideration and withdrawal of the rejection.

III. CLAIM REJECTIONS UNDER 35 U.S.C. § 103

Claims 11-16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Velasquez et al. Claims 11-13 depend from claim 10, either directly or indirectly, and therefore contain all the limitations thereof. Accordingly, for at least the same reasons given above in connection with claim 10, Applicants respectfully request reconsideration and withdrawal of the rejection.

Claim 14 has been amended, and Applicants respectfully overcome any rejection. Amended claim 14 recites, “A method of electrically connecting a battery module, comprising: configuring a first battery unit and a second battery unit; locating positive terminals at a first end of said first and second battery units, a first number of positive

terminals being equal to the number of said battery units; locating negative terminals at a second end of said first and second battery units, said second end opposing said first end relative to a horizontal axis, a second number of negative terminals equal to the number of said battery units; enclosing said battery units in individual packaging, said packaging comprising a single sheet of laminated, aluminized flexible material; and orienting said first battery unit and said second battery unit such that said positive terminal of said second battery unit is electrically connected to said negative terminal of said first battery unit, said second battery unit rotated around a horizontal axis 180 degrees such that first and second battery units create a stacked configuration.” (emphasis added).

The Office states that it would be obvious to one of ordinary skill in the art to rotate battery units when forming a stack since “rearranging parts of an invention involves only routine skill in the art.” Office Action, p. 4 (citing *In re Japikse*, 86 U.S.P.Q. 70). Amended claim 14 overcomes an obviousness rejection based on the prior art of Velasquez et al. because amended claim 14 not only captures the method of configuring the modules so that the battery units are rotated around a horizontal axis, but also captures the method of enclosing each battery unit in individual packaging.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations.

MPEP § 2143. Applicants submit that Velasquez et al. does not teach or suggest all of the limitations of amended claim 14. Velasquez et al. does not teach to enclose each battery unit in a “single sheet of laminated, aluminized flexible material” as positively claimed. Nor is such a method of electrically connecting a battery module, by using a flexible packaging material that includes a moisture barrier, suggested by Velasquez et al. Nothing in Velasquez et al. would suggest replacing the separate moisture barrier and stack receptacle with accompanying lid used to seal the battery unit with a single flexible packaging envelope. For all these reasons, amended claim 14 is not made obvious by Velasquez et al. Applicants respectfully request reconsideration and withdrawal of the rejection.

Claims 15-16 depend from claim 14, either directly or indirectly, and therefore contain all the limitations thereof. Accordingly, for at least the same reasons given above in connection with claim 14, Applicants respectfully request reconsideration and withdrawal of the rejection.

IV. CLAIM REJECTIONS UNDER 35 U.S.C § 103

Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Velasquez et al. in view of Guindy et al. (U.S. Pub. No. 2002/0081488 A1). The Office states that Velasquez et al. teach a plurality of bicells, including exposed grids, while Guindy et al. teach the use of terminal strips in contact with the current collectors. Office Action, p. 5. Applicants submit that there is no motivation to combine Velasquez et al. with Guindy et al. Moreover, even were it proper to combine Velasquez et al. with Guindy et al., the combination does not teach or suggest all of the claim limitations of amended claim 1 and dependent claims 3-4.

Velasquez et al. disclose a plurality of bicells including exposed anodic and cathodic grids that are electrically connected to a lead. Guindy et al. disclose that the anodic and cathodic grids, referred to as current collectors, may be welded together and then welded to a terminal. Although Guindy et al. refer to a “terminal strip” to which the exposed grids are welded, this “terminal strip” is distinct from the “cover strip configured to be in contact with said cathodic exposed grids” or the “cover strip configured to be in contact with said anodic exposed grids” as positively claimed in claims 3 and 4 respectively. The terminal strip of Guindy et al. is a separate piece or terminal to which the gathered current collectors are welded. The cover strip of claim 3 or 4 is a separate piece from the terminal. Therefore, while Guindy et al. disclose a terminal strip wherein the exposed cathodic or anodic exposed grids of the plurality of bicells are welded to a positive or negative terminal, claims 3-4 recite a “cover strip” that is welded to the cathodic or anodic exposed grids on an opposing side from where the anodic or cathodic exposed grids are welded to a positive or negative terminal. Guindy et al. disclose electrically connecting the grids to a terminal, not the utilization of a “cover strip,” a piece distinct from the positive or negative terminal.

Therefore, even if it were obvious to combine Velasquez et al. with Guindy et al. (which it is not), the combined references do not teach all of the limitations of claims 3 and 4. Claims 3-4 recite a cover strip distinct from the positive or negative terminal. For all these

reasons, claims 3-4 are not made obvious by Velasquez et al. in view of Guindy et al., and Applicants respectfully request reconsideration and withdrawal of the rejection.

V. CLAIM REJECTIONS UNDER 35 U.S.C § 103

Claims 5-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Velasquez et al. in view of Hanafusa et al. (U.S. 2001/0051298 A1) and Xing et al. (U.S. 6,403,262 B1). The Office states that Velasquez et al. teach a plurality of bicells, including exposed grids, while Hanafusa et al. teach the use of a plurality of apertures extending through the electrically conductive portion of a battery so that an adhesive can seal the outer layers of the foil casing. Office Action, p. 6. Applicants submit that Velasquez et al. in combination with Hanafusa et al. do not teach or suggest all of the claim limitations of amended claim 5.

Amended claim 5 recites, “The battery unit of claim 1 wherein said positive terminal and said negative terminal further include an electrically conductive body portion having a lengthwise axis associated therewith, including a first region configured to be adhered to and in electrical contact with said exposed grids of said plurality of bicells on a first side of said terminal, and adhered to and in electrical contact with, on a second opposing side of said terminal, a second region extending along said axis having a plurality of apertures therethrough, and a third region configured for electrical connection to a conductor.” (emphasis added). In Hanafusa et al., the apertures are in a region of the battery which is in electrical contact with the electrode lead lines, not that the region containing apertures be in electrical connection with “a first region . . . [that is] in electrical contact with . . . [the] exposed grids of said plurality of bicells” as positively claimed. Therefore, amended claim 5 is not rendered obvious by combining Velasquez et al. with Hanafusa et al. since amended claim 5 includes a recitation not taught or suggested by the prior art.. Furthermore, there is no motivation to combine references since the apertures serve completely different purposes in amended claim 5 and Hanafusa et al. In Hanafusa et al., the apertures allow an adhesive to flow through so as to adhere the lead lines to the battery, and in amended claim 5, the apertures aid in adhering the flexible packaging material to the terminal.

Claims 6-7 depend from claim 5, either directly or indirectly, and therefore contain all the limitations thereof. Accordingly, for at least the same reasons given above in connection with claim 5, Applicants respectfully request reconsideration and withdrawal of the rejection.

As an additional basis for patentability, it would not have been obvious to use the electrically insulating material of Xing et al. that surrounds the cathodic grids of a bicell with the plurality of bicells disclosed in Velasquez et al. In claim 6, the insulating material does not encapsulate the cathodic grids of a bicell, but rather encapsulates the “positive and negative terminals” as positively claimed. The use of an electrically insulated sleeve in claims 6 and 7 is to prevent the metallic layer of the flexible packaging material from touching the terminal and creating a current path. The insulator is used because the edge of the packaging material meets at that point where the insulator is applied to the terminal. Because Velasquez et al. do not utilize a packaging material with a metallic layer that may come in contact with a terminal, there is no motivation to combine the protective sleeve of Xing et al. to the plurality of bicells in Velasquez et al. to prevent shorting between the packaging material and terminal. Moreover, the motivation for the use of the protective sleeve in Xing et al. does not extend to the use of a protective insulative layer in amended claims 6-7 because Xing et al. uses the protective sleeve around a particular component of a bicell to prevent shorting when the tabs of the exposed cathodic grids are pressed together to form a lead, while amended claims 6-7 use the protective sleeve around a separate terminal attached to a plurality of bicells, not around an actual component of a bicell.

Amended claim 8 depends from claim 1 directly, and therefore contains all the limitations thereof. Accordingly, for at least the same reasons given above in connection with claim 1, Applicants respectfully request reconsideration and withdrawal of the rejection.

Amended claim 9 depends from claim 1 indirectly, and therefore contains all the limitations thereof. Accordingly, for at least the same reasons given above in connection with claim 1, Applicants respectfully request reconsideration and withdrawal of the rejection. As an additional basis for patentability, amended claim 9 recites, “The battery unit of claim 8 wherein said hot melt adhesive adheres to itself through said apertures of said positive and negative terminals.” (emphasis added). The apertures of Hanafusa et al. allow the inner resin of the laminated film to “pour[] through the numerous holes in the apertures [and] . . . when the resin in the apertures 59, 60 acts as a wedge, the laminated film and the electrode lead lines 2,3 are strongly adhered to each other.” The apertures of Hanafusa et al. do not allow the hot melt adhesive layer of the packaging envelope to “adhere[] to itself through said apertures” as positively claimed, creating an improved seal when the envelope is folded over the battery unit and adhesive flows through the plurality of apertures of the terminals on

opposing sides of the terminals. The plurality of apertures in Hanafusa et al. merely allows the resin layer of the laminated film to flow through the apertures and create a wedge between the laminated film and the electrode lead lines, not seal to itself as positively claimed. Claim 9 is not rendered obvious by combining Velasquez et al. with Hanafusa et al. or Xing et al. since the combination does not teach all the limitations. Applicants respectfully request reconsideration and withdrawal of the rejection.

VI. CLAIM REJECTIONS NOT ADDRESSED BY OFFICE


Although the Office Action cover sheet indicates that claim 2 has been rejected, the Office did not provide any basis for the rejection within the detailed action as required. Applicants respectfully seek clarification from the Office regarding the rejection of claim 2. Applicants reserve the right to respond to a rejection of claim 2, if any, that is ultimately made by the Office. However, as a basis for the patentability of claim 2, claim 2 depends from claim 1 directly, and therefore contains all the limitations thereof. Accordingly, for at least the same reasons given above in connection with claim 1, Applicants respectfully submit that claim 2 is allowable.

VII. CONCLUSION

For at least the above-cited reasons, all claims pending in the present application are now believed to be allowable. Early receipt of a Notice of Allowance is hereby respectfully requested.

Respectfully submitted,

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